CLAIMS

What is claimed is:

1. A process for making a zirconia catalyst, comprising the steps of:

(a) preparing a paste comprising a step selected from the group consisting of:

(i) mixing zirconium hydroxide with a solution of zirconyl nitrate, water, and nitric acid;

(ii) mixing relatively fine particle size zirconium hydroxide and relatively coarse particle size zirconium hydroxide with a solution of zirconyl nitrate and water; and

(iii) mixing relatively fine particle size zirconium hydroxide and relatively coarse particle size zirconium hydroxide with a solution of zirconyl nitrate, water, and nitric acid;

wherein, in (i), (ii), and (iii) there may optionally be one or more additional solvents added in addition to water;

(b) forming a shaped particle from the step (a) paste;

(c) drying the step (b) shaped particle; and

(d) calcining the dried step (c) shaped particle at a temperature of at least 400°C.

2. The process of Claim 1 wherein one or more additional solvents are added to step (a)(i), (a)(ii), or (a)(iii) of Claim 1.

3. The process of Claim 1 or Claim 2 additionally comprising adding at least one metal selected from the group consisting of cobalt, nickel, rhodium, palladium, iridium, platinum, manganese, lanthanum, and cerium to step (a) or to the calcined step (d) shaped particle.

4. The process of Claim 1 or Claim 3 comprising adding one or more additives selected from the group consisting of binders, lubricants, rheology control agents, and pore forming agents.

5. The process of Claim 1, wherein the optional solvent is selected from the group consisting of alcohol, ketones, aldehydes, aromatic solvents, and combinations thereof.

6. The process of Claim 1, wherein the amount of one or more solvents in the paste is 10%-40% by weight of the paste.

7. The process of Claim 3, wherein a rheology control agent or a pore forming agent is added in step (a).

8. The process of Claim 7, wherein the rheology control agent or pore forming agent is present in an amount of 0.5% to 20% by weight of the paste.

9. The process of Claim 3, wherein the metal added is cobalt at a level of 0.1% to 10%.

10. The process of Claim 9, wherein the level is 0.5% to 5%.

11. The process of Claim 10, wherein the level is 1% to 3%.

12. The process of Claim 3, wherein the metals added are cobalt and nickel at a combined level of 0.1% to 10%.

13. The process of Claim 12, wherein the combined level is 0.5% to 5%.

14. The process of Claim 13, wherein the combined level is 1% to 3%.

15. The process of Claim 1, wherein the shaped particle of step (b) is formed by extrusion.

16. A catalyst comprising zirconia, prepared by the steps of:

(a) preparing a paste comprising a step selected from the group consisting of:

(i) mixing zirconium hydroxide with a solution of zirconyl nitrate, water, and nitric acid;

(ii) mixing relatively fine particle size zirconium hydroxide and relatively coarse particle size zirconium hydroxide with a solution of zirconyl nitrate and water; and

(iii) mixing relatively fine particle size zirconium hydroxide and relatively coarse particle size zirconium hydroxide with a solution of zirconyl nitrate, water, and nitric acid;

wherein, in (i), (ii), and (iii) there may optionally be one or more additional solvents added in addition to water;

(b) forming a shaped particle from the step (a) paste;

(c) drying the step (b) shaped particle; and

(d) calcining the dried step (c) shaped particle at a temperature of at least 400°C.

17. The catalyst of Claim 16 additionally comprising adding at least one metal selected from the group consisting of cobalt, nickel, rhodium, palladium, iridium, platinum, manganese, lanthanum, and cerium to step (a) or to the calcined step (d) shaped particle.

18. The catalyst of Claim 16 or Claim 17 comprising adding one or more additives selected from the group consisting of binders, lubricants, rheology control agents, and pore forming agents.

19. The process of Claim 16, wherein the optional solvent is selected from the group consisting of alcohol, ketones, aldehydes, aromatic solvents, and combinations thereof.

20. The catalyst of Claim 16, wherein the amount of solvent in the paste is 10% - 40% by weight of the paste.

21. The process of Claim 16, wherein a rheology control agent or a pore forming agent is added in step (a).

22. The process of Claim 21, wherein the rheology control agent or pore forming agent is present in an amount of 0.5% to 20% by weight of the paste.

23. The catalyst of Claim 17, wherein the metal added is cobalt at a level of 0.1% to 10%.

24. The catalyst of Claim 23, wherein the level is 0.5% to 5%.

25. The catalyst of Claim 24, wherein the level is 1% to 3%.

26. The catalyst of Claim 17, wherein the metals added are cobalt and nickel at a combined level of 0.1% to 10%.

27. The catalyst of Claim 26, wherein the combined level is 0.5% to 5%.

28. The catalyst of Claim 27, wherein the combined level is 1% to 3%.

29. The catalyst of Claim 16 or Claim 17 wherein the crush strength is at least 65 newtons.

30. The process of Claim 1 or Claim 2 or Claim 3 wherein the crush strength of the catalyst produced is at least 65 newtons.

31. The use of the catalyst of Claim 3 or Claim 17 used for N_2O abatement.